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10/713,758	11/14/2003	Sharath Manjunath	PA742A1C1	3572

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Qualcomm Incorporated
Patents Department
5775 Morehouse Drive
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EXAMINER	
RIVERO, MINERVA	

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/713,758	MANJUNATH ET AL.	
	Examiner	Art Unit	
	Minerva Rivero	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In the Remarks submitted 6/15/05, Applicants amended the Specification to include numbers of related applications, amended claims 1-6, 8-9, 12, 17-21, 23, and 25-31, and submitted arguments for allowability of the pending claims.

Response to Arguments

2. Applicant's arguments with respect to claims 1-31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680), in view of Taniguchi *et al.* (EP Patent 0 417 739 A2).

Regarding claims 1 and 17, Cellario discloses a method of and system for classifying speech as active or inactive (Col. 1, Lines 50-51);

classifying active speech into one of a plurality of types of active speech (Col. 5, Lines 60- 65);

encoding the speech signal according to said coding mode, forming an encoded speech signal (Col. 1, Lines 58-60); and

selecting an encoder mode from a plurality of parallel encoder modes, wherein selecting the encoder mode is based on whether the speech signal is active or inactive, and if active, based further on said type of active speech (Col. 1, Lines 51-56).

However, Cellario does not explicitly disclose but Taniguchi *et al.* do disclose selecting an encoder mode from a plurality of parallel encoder modes (See Abstract, Lines 9-12; Fig. 2, elements 1_1, 1_2, 1_m). [See Applicants' Remarks submitted 6/15/05, Page 9, Lines 28-29 (*multiple hard-wired encoders, as understood by the examiner*)]

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to modify the teachings of Cellario and select an encoder from an plurality of encoder modes [See Applicants' Remarks submitted 6/15/05, Page 9, Lines 28-29 (*multiple hard-wired encoders, as understood by the examiner*)], as taught by Taniguchi *et al.* since it is one manner in which to implement multiple encoder modes.

5. Claims 2 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680) in view of Taniguchi *et al.* (EP Patent 0 417 739 A2), as

applied to claims 1 and 17 above, further in view of Weaver *et al.* (US Patent 5,956,673).

Regarding claims 2 and 18, Cellario discloses a method of and system for forming a synthesized speech signal (Col. 3, Lines 14-20).

However, the combined teachings of Cellario and Taniguchi *et al.* do not explicitly disclose but Weaver *et al.* do disclose decoding (encoded) speech signal (Col. 3, Lines 34-37).

Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Cellario and Taniguchi *et al.* and produce synthesized speech by decoding the original signal as taught by Weaver *et al.*, in order to produce a signal that is derived as close as possible from the source, with any appropriate signal features modified to improve the quality of the signal.

6. Claims 3-4 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680) in view of Taniguchi *et al.* (EP Patent 0 417 739 A2), as applied to claims 1 and 17 above, further in view of DeJaco (US Patent 5,911,128).

7. Regarding claims 3, 19 and 20, the claims are set forth with the same limitations as claims 1 and 17.

While Cellario does disclose specific methods of pitch period coding (Col. 2, Lines 9-12), neither Cellario nor Taniguchi *et al.* explicitly disclose the coding mode is a *CELP* coding mode. DeJaco, however, does disclose *CELP* coding (Col. 7, Lines 21-23).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Cellario and Taniguchi *et al.* with implementation of CELP coding as taught by DeJaco in order to provide an efficient method that results in the reduction of the amount of information sent over a channel, as taught by DeJaco (Col. 2, Lines 3-7). [Note: Claim is construed in the alternative mode.]

8. Regarding claims 4 and 21, while Cellario discloses the importance of bit rates (Col. 1, Lines 14-15), neither Cellario nor Taniguchi *et al.* associate them with coding modes.

DeJaco, however, does disclose a predetermined bit rate associated with a coding mode (Col. 1, Lines 47-49) and further discloses selecting a encoding rate based on comparison (Col. 5, Lines 24-26).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Cellario and Taniguchi *et al.* with encoding at a predetermined bit rate associated with the coding mode, as taught by DeJaco, in order to select the most suitable bit rate for the type of signal being

processed and to avoid wasting resources on noise and to prevent introducing anomalies such as those that result when noise is interpreted to be active voice, and to attain an optimal voice quality as taught by DeJaco (Col. 5, Lines 8-12).

9. Claims 5 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680) in view Taniguchi *et al.* (EP Patent 0 417 739 A2), further in view of DeJaco (US Patent 5,911,128), as applied to claims 4 and 21 above, further in view of Weaver *et al.* (US Patent 5,956,673), and further in view of De Martin (IEEE Conference on Acoustics, Speech and Signal Processing, May 1996).

Regarding claims 5 and 22, the combined teachings of Cellario, Taniguchi *et al.* and DeJaco do not explicitly disclose but Weaver *et al.* do disclose

the *CELP* coding mode is associated with a bit rate of 8500 bits per second (Col. 1, Lines 26-28) and

the *PPP* coding mode is associated with a bit rate of 3990 bits per second (Col. 1, Lines 26-28).

Furthermore, Weaver *et al.* do not disclose but De Martin does disclose the *NELP* coding mode is associated with a bit rate of 1550 bits per second (Page 218, Column 1, last paragraph).

Because these values are within normal laboratory tolerance for experimentation, being within 6.25% and 2.5%, respectively, of the claimed bit rates, it would have been obvious to one ordinarily skilled in the art at the time of the invention that the claimed bit

rates would have been discovered during the course of normal experimentation and included within these ranges and that further, they would be adopted upon finding that they contributed significant benefits over other arbitrary values in the same ranges.

10. Claims 6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680) in view of Taniguchi *et al.* (EP Patent 0 417 739 A2), further in view of DeJaco (US Patent 5,911,128), as applied to claims 3 and 19 above, further in view of Massaloux (US Patent 5,812,965).

Regarding claims 6 and 23, the combined teachings of Cellario, Taniguchi *et al.* and DeJaco do not disclose, but Massaloux does disclose a method and system with the practice of analyzing and storing the current frame for inactive periods (Col. 1, Lines 55-56) in the same terms as specified as the definition for *zero rate mode* in the immediate application disclosure (Page 24, Lines 17-20).

As defined by the applicant in the specifications of the immediate application, *zero-rate mode* is exception processing for conditions where conventional algorithms would produce anomalies, dropping a factor to zero or infinity and making actualization impossible.

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the invention to supplement the combined teachings of Cellario, Taniguchi *et al.* and DeJaco and maintain or adopt prior mode factors and use the alternative processing as taught by Massaloux in order to avoid producing anomalous results.

11. Claims 7-8 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680), in view of Taniguchi *et al.* (EP 0 417 739 A2), and further in view of Iijima *et al.* (US Patent 5,909,663).

12. Regarding claims 7 and 24, the claims are set forth with the same limitations as claims 1 and 17, respectively. Cellario discloses the types of speech include voiced and unvoiced (Col. 1, Lines 51-55).

However, the combined teachings of Cellario and Taniguchi *et al.* do not disclose but Iijima *et al.* do disclose the types of active speech include transient active speech (*U and UV are unvoiced and voice, respectively*, Col. 16, Lines 60-62).

Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Cellario and include transient active speech as a type of active speech, as taught by Iijima *et al.* in order to provide coverage against loss of speech that would result from abrupt changes in extreme modes.

13. Regarding claims 8 and 25, the claims are set forth with the same limitations as claims 7 and 24, respectively. Cellario addresses coding but does not disclose the use of the *CELP* mode of coding speech for *active transient* types. However, Iijima *et al.* disclose both, implementing *CELP* (Col. 28, Line 65).

While not referring to the type and mode as *PPP*, Iijima *et al.* describe processing speech associated with residuals (Col. 3, Lines 51) as described in the specifications of the immediate disclosure. In addition, again not using the same terms but processing

the same elements as described in the disclosure for *NELP*, Iijima *et al.* disclose processing the noise features (Col. 4, Line 24).

Because all elements are addressed in regards to singularly processing a speech signal, it would have been obvious to a person of ordinary skill in the art at the time of the invention to supplement the teachings of Cellario and processing the elements as taught by Iijima *et al.* so as to have them arranged and fall into appropriate categories to receive best performance with least loss of data and least propagation of anomalies.

14. Claims 9 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680), in view of Taniguchi *et al.* (EP 0 417 739 A2), further in view of Iijima *et al.* (US Patent 5,909,663), as applied to claims 8 and 25 above, and further in view of Atal (US Patent 4,764,963).

Regarding claims 9 and 26, Cellario teaches coding but does not disclose the methods. Iijima *et al.* address the first feature of the claims by disclosing an association of pitch parameters with *CELP* (Col. 1, Lines 23-24) and use of a codebook to process noise (Col. 3, Line 34) with selection of *CELP* coding.

Iijima *et al.* address the equivalent of *PPP* as concerning previous frame pitch periods as specified in the disclosure (Col. 3, Line 40) and requisite *codebook* (Col. 4, Line 9). Atal discloses the use of *rotational* parameters (Col. 7, Line 65), thus addressing the final limitation of the claims.

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Cellario with those of Iijima *et al.* and Atal and accompany signals with the requisite and appropriate parameters of codebook and pitch filter for *CELP*, codebook and rotation for *PPP* or prototype and codebook alone for the stochastic *CELP* noise feature processing, termed *NELP* in the immediate application, to enable these coding modes to be used.

15. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680), in view of Taniguchi *et al.* (EP 0 417 739 A2), further in view of Swaminathan *et al.* (US Patent 5,734,789).

16. Regarding claim 10, the claim is set forth with the same limitations as claim 1. Cellario does specify that processing will involve *next frames* (Col. 7, Lines 10-11) but does not explicitly disclose this as utilizing a *look ahead* feature. Swaminathan *et al.* specifically describe the implementation of *look ahead* processing (Col. 5, Lin 53).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Cellario and Taniguchi *et al.* and modify the value of present calculations by the influence of known future changes as taught by Swaminathan *et al.* as opposed to relying on expected variations that may be incorrect.

17. Regarding claim 11, the claim is set forth with the same limitations as claim 10. Cellario discloses the use of *LPC* coding (Col. 1, Line 16) but not specifically as to parameter position, initial or otherwise. Swaminathan *et al.* distinguish the *initial* pitch estimate feature (Col. 5, Line 47) in conjunction with *LPC* (Col. 7, Line 19), in conjunction with parameters (Col. 9, Lines 10-11).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to provide for a first or initialized value where necessary as taught by Swaminathan *et al.* in order to avoid the uncertainty of presenting algorithms with undefined computer memory locations at the start of the computer processing.

18. Claims 12-16 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cellario (US Patent 5,548,680) and Taniguchi *et al.*, as applied to claims 1 and 17 above, in view of Swaminathan *et al.* (US Patent 5,734,789), further in view of DeJaco (US Patent 5,911,128) and further in view of Massaloux (US Patent 5,812,965).

19. Regarding claims 12 and 27, the claims are set forth with the same limitations as claims 1 and 17, respectively. Concerning the first feature of *encoding* with the subsequent limitation of *estimating the energy of the residual signal*, Cellario discloses this as a *short-term prediction residual signal* (Col. 2, Line 8).

However, the combined teachings of Cellario and Taniguchi *et al.* do not address the further limitation of *selecting a codevector from a first codebook, wherein said codevector approximates said estimated energy*; Swaminathan *et al.* (Col. 1, Line 32-33) disclose the equivalent operation of "searching the codebook for the vector that produces a filter output signal that is closest to the output signal."

Regarding the feature of *decoding* and the subsequent features of *generating a random vector*, DeJaco discloses these specifically (Col. 12, Line 6). DeJaco does not specifically address *retrieving said codevector from a second codebook*, the second codebook as in the subsequent feature of the claims, but Swaminathan *et al.* describe this with regard to *Separate VQ codebooks* (Col. 4, Line 41).

As to the subsequent feature of the claims, of *scaling random vector on codevector*, Swaminathan *et al.* address these (Col. 21, Lines 20-23), and as "*such that the energy of said scaled vector approximates said estimated energy*" (Col. 21, Lines 24-29). Swaminathan *et al.* also provide reference with "the fixed codebook vector for each subframe is inferred from the fixed codebook from the received fixed codebook index associated with that subframe and this is scaled by the fixed codebook gain (Col. 21, Lines 24-29).

Regarding the final limitation of the claims, Massaloux describes *filtering said scaled random vector with a LPC synthesis filter*, (Col. 6, Line 61), *wherein said filtered scaled random vector* (Col. 1, Line 63), and that it *forms said synthesized speech signal* (Col. 3, Lines 23-25).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to effectively code speech by the well known practice of encoding, then decoding, both to provide a clearer signal for transmission and to compare with the original speech for accuracy to avoid extraneous sounds and loss, to allow reprocessing if necessary to maintain quality.

20. Regarding claims 13 and 28, the claims are set forth with the same limitations as claims 12 and 27, respectively. The combined teachings of Cellario and Taniguchi *et al.* do not address the structure of his *frames*. Concerning the first limitation, Swaminathan *et al.* teach that the *speech signal is divided into frames* and (Col. 12, Line 10) *each of said frames comprises two or more subframes* (Col. 19, Lines 1-2).

As to the second limitation of estimating the energy of the residual signal, Swaminathan *et al.* disclose this (Col. 4, Lines 20-26). Swaminathan *et al.* address the limitations of estimating the energy for each subframe (Col. 6, Lines 55-57) and of having codevectors comprising a value approximating the estimated energy for each subframe (Col. 19, Lines 9-11).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to divide incoming speech signals into segments of logical length or frames to fit into computer memory and allow processing before the entire signal is completed, and to further divide those logical frames into smaller segments that influence and represent only the speech at the immediate moment and that can be processed, examined and discarded without influencing later speech signal processing.

21. Regarding claims 14 and 29, the claims are set forth with the same limitations as claims 12 and 27. The combined teachings of Cellario, Taniguchi *et al.* and Swaminathan *et al.* do not disclose *stochastic codebooks*. DeJaco discloses the sole feature and limitation, being of *stochastic coding* (Col. 1, Line 41). Because in the *CELP* encoding structure for the unvoiced portion of the input speech signal, noise output corresponding to the LPC residuals of the unvoiced sound is representative of the noise codebook, or so-called stochastic codebook.

The examiner notes that of the two different stochastic codebook types, trained and algebraic, trained codebooks characteristically have all nonzero vectors, different in amplitude and sign while algebraic codebooks usually have only a few nonzero samples, often the amplitudes of which are set to one. Full search in a trained codebook is more complex than with an algebraic codebook, which requires a large number of different codevector candidates for good reproduction of speech. However, no memory is required to store an algebraic codebook, since the candidate vectors can be constructed online during the codebook search step.

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Cellario, Taniguchi *et al.* and Swaminathan *et al.* and provide a codebook as taught by DeJaco that is oriented toward the primary coding technology that minimizes computer space requirements.

22. Regarding claims 15 and 30, the claims are set forth with the same limitations as claims 12 and 27. The combined teachings of Cellario and Taniguchi *et al.* do not

address *trained codebooks*. Swaminathan *et al.* disclose the sole feature and limitation of *trained codebooks* (Col. 5, Line 30).

The examiner notes that of the two different stochastic codebook types, trained and algebraic, trained codebooks characteristically have all nonzero vectors, different in amplitude and sign while algebraic codebooks usually have only a few nonzero samples, often the amplitudes of which are set to one. Full search in a trained codebook is more complex than with an algebraic codebook, which requires a large number of different codevector candidates for good reproduction of speech.

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the combined teachings of Cellario and Taniguchi et al. and provide a trained codebook as taught by Swaminathan *et al.* to reduce the required processing power.

23. Regarding claims 16 and 31, the claims are set forth with the same rejections as claims 12 and 27, respectively. The combined teachings of Cellario, Taniguchi *et al.* and Swaminathan *et al.* do not disclose *unit variance random vectors*. DeJaco discloses the sole feature and limitation of a normalized codevector, suggesting a *unit variance random vector* with the implementation of random vectors (Col. 12, Lines 5-7).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Cellario and Swaminathan *et al.* with selecting vectors at random as taught by DeJaco in order to avoid using the same vector as before or otherwise establishing any pattern of coincidence when adding

noise or evaluating excitation that would be manifested as repetitive propagation or anomalies in the signal.

Conclusion

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minerva Rivero whose telephone number is (571) 272-7626. The examiner can normally be reached on Monday-Friday 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

W. R. YOUNG
PRIMARY EXAMINER

MR 9/7/05